



## 1. General introduction

### 1.1 The dairy sector

#### 1.1.1 World context

Currently, almost 50% of the global cow milk production is concentrated in seven countries: the USA, India, China, Russia, Germany, Brazil and New Zealand. In recent years, China, India, New Zealand and Brazil have increased milk production, while Russia and Germany have reduced production, making way for new countries on the international market. Figure 1 shows the world production in 2011 (FAO 2012).

The international milk market is dominated by the European Union and the USA. The productivity of both is based on subsidies, and exports represent only the production surplus. In 2008, the trade balance of dairy products was US\$ 298 million in surplus, reflecting the increase in exports caused by the increase of milk powder price on the international market (FAO 2012).

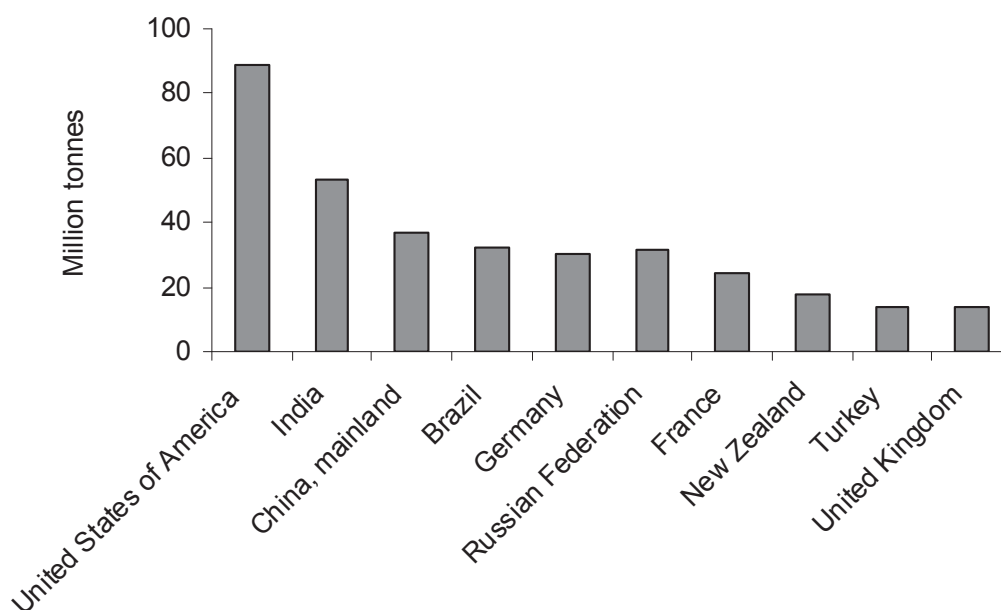


Figure 1: World milk production in 2011 – Top producers (FAO 2012).

Milk is one of the products within MERCOSUR (Southern Common Market) that is most sensitive in changes to policies and taxes. Brazil exports milk to Venezuela (22%), Angola (10%) and South Africa (9%), mainly as condensed milk and powdered milk. In international trading, quantities of raw milk are low due to its perishability and high transport costs, and powdered milk is the main export product. However, cheese and tetra pack technologies are increasing the exportation of less processed milk (FAO 2012).



### 1.1.2 Brazilian context

In Brazil, agriculture accounted for 10% of the Gross Domestic Product - GDP, and the livestock sector for 45% of agricultural turnover in 2002. Between 1990 and 2002, volumes of meat and milk availability per capita increased by 71% and 27%, respectively (World Bank 2011). The value of the milk chain in Brazil is around US\$ 32 million per year, employing 4 million people. The dairy sector is larger than other important sectors such as foundry and textile industries (Fundacao Banco do Brasil 2011).

The annual world milk production in 2009 was 583,401 million liters, with Brazil ranking fourth, producing 29,112 million liters from around 20,500 million cows in lactation, with an average annual production of 1,137 liters per cow per year (FAO 2011a).

Considering that it is one of the most important milk producers in the world, Brazil has a livestock dairy sector with surprisingly low profitability for producers. This is in part due to the heterogeneity of production systems, where 2.3% of farms are specialized in milk production with efficient production systems, whilst 90% of milk producers are considered small scale farmers with low production volumes, low productivity per cow and limited use of technology (Fundacao Banco do Brasil 2011).

The low profitability is a consequence of the low technical efficiency: in Brazil, the average stocking rate is one cow per hectare, and milk production of cows in lactation is 4.88 liters per day (IBGE 2012). Both these averages are low when compared to specialized systems in others countries and these kinds of extensive systems are contributing to the low efficiency and need for improvement to meet the needs of both the market and farmers.

Brazil started importing dairy products in the second half of the nineties, but since then has been moving closer to self-sufficiency, and export sales are increasing. These changes have been driven by the growth of demand for dairy products in the country and by the liberalization program carried out by the government since the late eighties. After four decades of market regulation the domestic dairy sector was liberalized and opened to international competition in 1991, when Brazil started to trade within MERCOSUR (Southern Common Market), and in 1995 when it became a member of the World Trade Organization (Farina 2002).

### 1.1.3 External milk market

Brazil started trading dairy products on the international market in 2000, and by 2007/2008 a positive trade balance had been achieved in the dairy sector. This was primarily due to the high price of powdered milk on the international market at that time, a reduction in world milk production and a favorable exchange rate for the national currency.



As a consequence of the economic crisis, in 2009, the exchange rate for the national currency increased, whilst the price of powdered milk dropped on the international market. Exports from Brazil were 30% lower than in 2008, imports were 24% higher and the national dairy trade balance was US\$ 114.15 million in deficit. Currently, investments in the milk production sector and exportations are a governmental priority; according to the Agriculture Development Ministry (MDA 2013), milk exportation must be increased by 30% until 2014. The policy initiative is a combined action between the Agriculture Development Ministry (MDA), National Agency for Exports and Investments (APEX-Brasil) and the Brazilian Cooperatives Organization (OCB). The OCB participation affirms that 40% of produced milk in Brazil is directly or indirectly related to a cooperative, involving more than 1.3 million of rural properties being small scale in most cases (OCB 2013).

#### **1.1.4 Domestic milk market**

The domestic market is very important for the dairy sector in Brazil, and production within the country is geographically quite concentrated. 80% of cow milk consumed in the country is produced in only 6 of the 27 federal states: Minas Gerais, Rio Grande do Sul, Goias, Sao Paulo, Parana and Santa Catarina.

Of the milk production in Brazil, 35% is marketed as liquid milk, 33% as cheese, 24% as powdered milk and 8% as milk-based drinks and yoghurts (IBGE 2011). The most important domestic demand is for UHT (Ultra High Temperature) milk, representing 80% of domestic liquid milk sales. This product has almost totally replaced the fresh milk which accounted for the majority of liquid milk sales before the nineties in Brazil (Fundacao Banco do Brasil 2011).

Before milk market liberalization around 20 years ago, the milk market in Brazil was concentrated on cooperatives of farmers, who produced 60% of raw milk volume in the country, with 40% produced by private companies. Today, the situation is the exact reverse, with private companies producing 60% and cooperatives less than 40%. The main reasons for this change can be traced back to market liberalization and free competition between private companies in the market.

Private companies have been buying milk cooperatives and other small companies, international groups are investing in the Brazilian milk market, and multinationals are competing with private national companies. This market jump has been detrimental for milk cooperatives, which have in the last 20 years either closed down, been bought by larger companies, or are reducing their role to milk collection to then sell to private companies.



### **1.1.5 Milk producers and changes in the Brazilian milk market**

As mentioned above, small scale farmers are producing 90% of the milk in the Brazilian domestic market. Small scale farmers have land properties less than 100 ha in size, family labor is prevailing over hired labor and work is supervised by the producer (MDA 2013). These farmers keep 10 or fewer dairy cows, and manage 50% of the national dairy herd. Between 1997 and 2000, 43% of milk produced in Brazil was marketed informally (Ostrowski and Deblitz 2001).

The liberalization of the dairy sector affected small scale farmers, the number of which declined from 1.8 million in 1996 to and 1.4 million in 2003, equivalent to a rate of roughly 3% per year. Milk supply data for the 12 major dairy industries indicates that the number of suppliers between 1996 and 1998 reduced by 28% and supply per farm increased by 37% (Costales 2008).

Liberalization, market competition, and the related low prices in the dairy sector are among the reasons for the reduction in the number of small scale farmers in the formal market. At the same time, these also lead to changes in the processing industry: with increasing competition among processors, new management systems developed, including refrigeration tanks on farms. In order to increase milk quality, the government requires that all producers acquire on-farm cooling and storage facilities to meet international standards, eliminating type C milk from market. Considering that the smallest tank in Brazil for milk refrigeration holds 200 liters, and farm production averages 50 liters of milk per day, most small scale farmers are unable to meet this requirement and are thus forced out the milk market (Farina 2002; Costales 2008).

### **1.2 Problem definition**

In Brazil, more than 2 million families living in rural areas are considered small scale farmers. The small farmers in Brazil produce 70% of food for the domestic market and represent 83.3% of the Brazilian population that lives below the poverty line (PRONAF 2009). Milk production is an important activity for these farmers, as a means of subsistence and playing an important role in regional development (OCB 2013).

In the south of Brazil, the state of Rio Grande do Sul is a region where small scale farmer agriculture is of high significance; it was therefore used as study location. Considering the exclusion of small scale farmers from the dairy industry, this study analyzed the effects of changes in the milk system on small milk producers, observing the influence of milk cooperatives on this system, and trying to find sustainable reasons to maintain small scale farmers in the dairy sector and on their land.



### 1.3 Research objectives

Considering the role of small farmers in Rio Grande do Sul, the objectives addressed in this study were to:

1. Characterize and classify small scale livestock production systems.
2. Quantify the share of income provided by livestock in Rio Grande do Sul.
3. Compare milk production and cow productivity in dairy cattle, between smallholders who receive support from milk cooperatives, versus those who do not receive any support.
4. Compare market access of smallholders who receive support from milk cooperatives versus those who do not receive any support.
5. Determine feed use efficiency in small scale dairy systems.

### 1.4 Research hypotheses

The study on the impact of milk marketing strategies of small scale farmers and on ways to improve livestock husbandry in Rio Grande do Sul departed from the following hypotheses:

1. Cooperative support encourages intensification of livestock activities by small-scale farmers in Brazil.
2. Livestock production significantly contributes to household income of small-scale farmers in Rio Grande do Sul.
3. Small scale livestock producers do not differ in productivity irrespective of support by cooperatives.
4. Small scale livestock producers do not differ in market access irrespective of support by cooperatives.

### 1.5 Materials and methods

#### *Sites*

The study was carried out in the three villages, namely: Cangucu (31° S 53° W), Pelotas (31° S 52° W) and Sao Lourenco do Sul (31° S 51° W), all of which are located in the southern part of Rio Grande do Sul state. The villages are located within a distance of 270 to 150 km of Porto Alegre, the capital city and most important economic center of Rio Grande do Sul. These villages were selected due to their large representation of small scale agriculture that is characteristic of Rio Grande do Sul.

#### *Socio- economic household survey*

The first stage of the study was a baseline survey (spring 2010) targeting small scale farming households in each of the three study villages. During this initial survey,